

NOTES

RANGE EXTENSIONS AND CORRECTIONS FOR *Pinus jeffreyi* AND *P. coulteri* (PINACEAE) IN NORTHERN BAJA CALIFORNIA.—High resolution aerial photography (Mexico Instituto Nacional de Estadística Geográfica e Informática (INEGI) 1972, Scale 1:40,000; Mexicana Aerofoto, Mexico City 1938, Scale 1:20,000) permits accurate identification and mapping of larger trees occurring in inaccessible terrain of Baja California Norte, Mexico. The holistic view provided by comprehensive aerial coverage permits detailed mapping of species not possible in the field, including discovery of unreported populations and errors in published maps. This note revises the distribution of *Pinus jeffreyi* and *P. coulteri*, which reach their southern limits in northern Baja California (Fig. 1).

Both trees were identified from their morphological structure and color record exclusively, rather than habitat and physiography to avoid circular reasoning attendant with correlation of their distributions with environmental gradients (Minnich et al., U.S.D.I. Contract, Technical Report III, Dept. Earth Sciences, Univ. California, Riverside. 1969; Thorley et al., p. 1353–1426 in Bowden and Pruitt, eds., Manual of remote sensing. 1975). *Pinus jeffreyi* was identified by its large height, rounded crown perimeter, flattened crown summits (of mature trees), and blue green hue. *Pinus coulteri* is a shorter tree with larger crown spread; it also prunes poorly with the canopy extending to the ground. To correlate field information with photography, I have trekked through and photographed many forests in several trips to the Sierra San Pedro Mártir (Minnich, Madroño 29:22–31. 1982), along the crest of the Sierra Juárez (La Rumberosa to El Topo, Laguna Juárez, Santa Catarina, and Valle de la Trinidad), and by binocular observation from Mexico Hwys. 3 (Tecate to Ensenada) and 16 (Ensenada to San Felipe). Map accuracy in the Sierra Juárez is simplified by the fact that these pines are the only tall trees in the range. In the Sierra San Pedro Mártir, *P. jeffreyi* is separated from other taxa of mixed conifer forests on the basis of crown perimeter structure.

PINUS JEFFREYI. Four populations (ca. 30 trees total) have been discovered at the north end of the Sierra San Pedro Mártir: two within 1 km southwest and northwest of Cerro San Matias (31°14'N, 115°29'W, elevation 2000 m), one in a basin perched on the mountain divide 2 km to the southwest (1600 m), and another wash 2 km south southeast (place names based on 1:50,000 topographic sheets published by INEGI). The Cerro San Matias populations extend the range about 10 km north of the mapped limit in the San Pedro Mártir (Critchfield and Little, U.S. Forest Serv., Misc. Publ. 991. 1966). To the south, *P. jeffreyi* dominates an extensive mixed conifer forest extending ca. 40 km along the high mountain plateau, except along the eastern wall of the range where forests are dominated by *Abies concolor*, *Pinus lambertiana*, and *Cupressus montana*. The southern limit of *P. jeffreyi* is in Arroyo Santa Eulalia (30°39'N).

In the Sierra Juárez, *P. jeffreyi* reaches its southern limit in two shallow basins on a plateau (30°40'N, 115°45'W) just south of Moran's (Phytologia 35:205–208.1977) observation of the tree along the bottom of Arroyo Rincón. Basin floors and water-courses in the higher, arid Sierra Juárez volcanic tablelands further south (1600–1800 m) contain only *Quercus peninsularis* and *Pinus quadrifolia*. Well-drained slopes above are covered with chaparral or solid stands of scrubby *Quercus chrysolepis* on northern exposures. The populations on Cerro San Matias and Mesa la Vinata Romero reduce the *P. jeffreyi* disjunction across San Matias Pass to 50 km. *Pinus jeffreyi* forests in the Sierra Juárez are more fragmented than mapped by Critchfield and Little (op. cit.) with most stands occurring along meadows, basin floors, and water-courses (1400–1700 m). Chaparral covers steep slopes to the highest summits (1900 m).

A third population mapped by Critchfield and Little (op. cit.) near the U.S.–Mexican

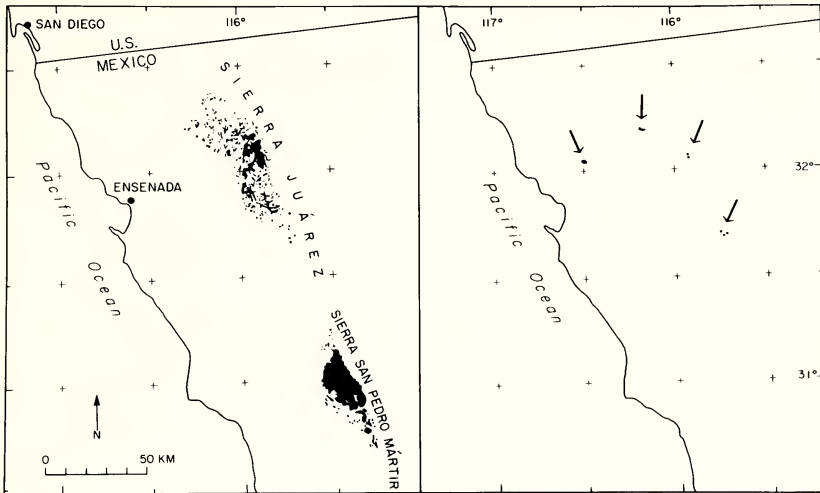


FIG. 1. The distributions of *Pinus jeffreyi* (left) and *P. coulteri* (right) in northern Baja California.

border is in error. The northern limit of *P. jeffreyi* comprises several groves along a wash 3 km north of Valle Los Pinos (15 km ese. of Neji, 32°23'N, 116°10'W). The plateau near the border is apparently too low for the tree (1100–1300 m), which recurs again 60 km north in the Laguna Mountains of San Diego County.

PINUS COULTERI. *Pinus coulteri* is extremely rare in northern Baja California. The most substantial population is also the westernmost: a small forest of ca. 50 ha on Sierra Blanca, just south of Valle Guadalupe, accurately mapped by Critchfield and Little (op. cit.). Scattered groves also occur on Cerro Hanson (La Sierrita), a small peak just northwest of Laguna Juárez (Hanson), including a stand seen by Moran (op. cit.) (32°03'N, 115°56'W). Several populations are found on steep knolls a few km north. In the northern Sierra Juárez plateau, *P. coulteri* is far less extensive than mapped by Critchfield and Little (op. cit.), based on a report by Goldman (Contrib. U.S. Natl. Herb. 16:309–371. 1916). I agree with Moran (op. cit.) that Goldman probably saw the Cerro Hanson groves because the Biological Survey expedition never traveled the wagonroad between Laguna Juárez and Campo (Nelson, Mem. Natl. Acad. Sci. 16. 1921). Aerial photographs record only one cluster of *P. coulteri* groves on rocky slopes immediately southwest of Rancho San Faustino, 7 km north of San Juan De Dios (32°13'N, 116°12'W). Scattered individuals reported on the south and north rims of Arroyo Rincón by Moran (op. cit.) are also clearly visible on photographs, and from Santa Catarina, but no other populations were seen south of there, including the Sierra San Pedro Mártir (Minnich op. cit.).

Most *P. coulteri* grow in thin chaparral on highly resistant granite or steep volcanic mesas so rocky that fire can rarely pass over the stands. Although *P. coulteri* can reproduce immediately after burns owing partly to its semi-serotinous cone habit (Minnich, p. 55–61 in Plumb, U.S. Forest Serv. Tech. Rep. PSW-44. 1980; Borchert, Madroño 32:29–48. 1985), these southern populations appear to find refuge in fire resistant habitats. Such stands provide a secure seed source that may become critical when fires are followed by drought severe enough to cause reproductive failure.

Differences in *P. jeffreyi* and *P. coulteri* distribution reported here are not due to actual vegetation changes owing to disturbances. Registration of 1938 and 1972 aerial photographic coverages with a Bausch and Lomb Zoom Transfer Scope reveal nearly identical distributions in spite of widespread burning during the intervening period

(fires mostly passed beneath the trees). Forests in the Sierra Juárez were only selectively logged near Laguna Juárez. Sierra San Pedro Mártir forests have never been logged.

The scale of photographs will not permit identification of possible hybrids between *Pinus jeffreyi* and *P. coulteri* (Zobel, *Evolution* 5:405–413. 1951; Madroño 11:283–284. 1952). However, with the exception for stands above Laguna Juárez, all *P. coulteri* populations are far from *P. jeffreyi* forests. In cursory field observations at Laguna Juárez, I found that the trees occur in ecologically divergent habitats in a characteristic pattern of southern California. *Pinus jeffreyi* occurs on basin floors whereas *P. coulteri* covered chaparral slopes on ridges above. I saw no intermediates.—RICHARD A. MINNICH, Geography Program, Dept. Earth Sciences, Univ. California, Riverside 92521. (Received 4 Apr 1985; revision accepted 13 Nov 1985.)

TAXONOMY OF OREGON SEMAPHORE GRASS, *Lophochlaena oregona* (POACEAE).—The taxonomic status of Oregon semaphore grass remains unsettled. The first collection of the grass in 1886 by W. C. Cusick was misidentified as *Lophochlaena californica* Nees [*Pleuropogon californicus* (Nees) Benth. ex Vasey], which explains why Vasey (*U.S.D.A. Bull.* 13(2):1–207. 1893) reported that the latter species occurred also in Oregon. After two more collections were made in 1901 and 1927, its distinct specific status was recognized by Chase (*J. Wash. Acad. Sci.* 28:52–53. 1938), who named it *Pleuropogon oregonus*. Her treatment was accepted by Benson (*Amer. J. Bot.* 28:358–360. 1941) and by Hitchcock et al. (*Vascular Plants of the Pacific Northwest. Part I*, Univ. Wash. Press, Seattle. 1969). Löve and Löve (*Bol. Soc. Brot. Sér. 2*, 53:563–585. 1980) suggested, however, that the taxon is merely a genetic variant of *Lophochlaena refracta* A. Gray [*Pleuropogon refractus* (A. Gray) Benth. ex Vasey]. Their arguments were that (1) a short awn, characteristic of *L. oregona*, was observed on the palea in an individual of the progeny obtained from sowing a plant of *L. refracta* from the Olympic Peninsula, and (2) the taxon could not be rediscovered anywhere in nature after its description.

With the rediscovery of Oregon semaphore grass in Adel, OR (But et al., Madroño 32:189–190. 1985), it is possible to reevaluate its taxonomic status. This grass can be distinguished readily from *L. refracta* by a combination of the following characters: (1) lemmas shorter, 5.5–7 mm long, and prominently scabrous-nerved, (2) palea margins distinctly and consistently bearing an awn 5–12 mm long, (3) spikelets gynomonocious with a special kind of flowering pattern, and (4) caryopses oval and smaller, 2.5–3 mm long. I am of the opinion that Oregon semaphore grass should be treated as specifically distinct from *L. refracta*.

Löve (*Taxon* 27:375–392. 1978) and Löve and Löve (*ibid.*) redefined *Pleuropogon* as a monotypic genus consisting solely of an arctic-circumboreal species, *P. sabinii* R. Brown, and referred the western cordilleran species to *Lophochlaena* Nees. Stebbins (*In Jorgensen et al.*, *Biol. Skr.* 9(4):1–172. 1958), Tateoka (*Bull. Natl. Sci. Mus.* 12: 161–163. 1965), and Tsvelev (*Grasses of the Soviet Union, Part II*: 545. 1976. Engl. translation 1983) also suggested similar treatment. Concurring with the narrower generic concept of these authors, I propose the following combination:

***Lophochlaena oregona* (Chase) But comb. nov.**—*Pleuropogon oregonus* Chase, *J. Wash. Acad. Sci.* 28:52. 1938.—TYPE: USA, Oregon, Union Co., Union, 8 Jun 1901, *Leckenby s.n.* (Holotype: US!).

Representative specimens. USA: OREGON: Union Co., Hog Valley, probably near Union, 1886, *Cusick 1316* (ORE, US); Lake Co., 25.8 km w. of Adel, 29 Jun 1937, *Peck 19568* (WILLU); Mud Creek, 25 km w. of Adel on Hwy. 140, 4 Jun 1979,